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ABSTRACT

In an experiment conducted under classroom conditions with 8th grade students, the simulation game "Democracy" was shown to be effective at teaching that "log-rolling" is an acceptable part of the legislative process. Two aspects of the game--role identification and game structure--were shown to contribute independently to its effectiveness. However, the game proved ineffective in changing political attitudes not directly related to log-rolling. (Author)

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SIMULATION GAMES AND POLITICAL ATTITUDES: THE IMPORTANCE OF ROLE IDENTIFICATION AND GAME STRUCTURE

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INTRODUCTORY STATEMENT

The Center for Social Organization of Schools has two primary objectives: to develop a scientific knowledge of how schools affect their students, and to use this knowledge to develop better school practices and organization.

The Center works through five programs to achieve its objectives. The Academic Games program has developed simulation games for use in the classroom. It is evaluating the effects of games on student learning and studying how games can improve interpersonal relations in the schools. The Social Accounts program is examining how a student's education affects his actual occupational attainment, and how education results in different vocational outcomes for blacks and whites. The Talents and Competencies program is studying the effects of educational experience on a wide range of human talents, competencies, and personal dispositions in order to formulate -- and research -- important educational goals other than traditional academic achievement. The School Organization program is currently concerned with authority-control structures, task structures, reward systems, and peer group processes in schools. The Careers and Curricula program bases its work upon a theory of career development. It has developed a self-administered vocational guidance device to promote vocational development and to foster satisfying curricular decisions for high school, college, and adult populations.

This report, prepared by the Academic Games program, examines two aspects of a simulation game to determine their independent contributions to the game's effectiveness.

ACKNOWLEDGMENTS

I thank Christine Pryka, for her co-operation and assistance in conducting the experiment reported here, and Gail Fennessey for her many helpful comments on an earlier version of this paper.

INTRODUCTION

For several years, a small group of educational researchers have been investigating the educational effectiveness of simulation games. The findings of this research have been mixed, although simulation games generally seem to be more successful at changing students' attitudes than at teaching knowledge or skills.[1]

A recent study by Livingston and Kidder (1972), using the Democracy game (Coleman, 1969), represents an attempt to progress beyond the question, "What objectives does the game accomplish?" to the question "What characteristics of the game are responsible for its effectiveness?" Previous research (Livingston, 1972) had indicated that the Democracy game is particularly effective at teaching students to accept "log rolling" (i.e. exchange of support by legislators) as part of the legislative process in a democracy.[2] Livingston and Kidder subdivided this game into two major components, which they called "game structure" and "role identification." Game structure included such things as the scoring system and the order of play, which represent the game designer's attempt to reproduce what he considers to be the main incentives and constraints that guide the behavior of real congressmen. "Role identification" included all those features of the game that inform the player that his role is that of a congressman. The results showed that both game structure and role identification contributed to the effectiveness of the game.

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[1] These findings are briefly summarized in a forthcoming book by Livingston and Stoll (1972, Ch. 5). Some of the earlier studies are reported in detail by Boocock and Schild (1968).

[2] The Democracy game materials actually contain rules and equipment for eight games, all of which are really variations of a single basic game. This basic game is identified in the kit as "Game 1: Legislative Session." In this paper the phrase "Democracy game" will be used to refer to this basic game.

The experiment by Livingston and Kidder (1972) appears to be the first in which role identification and game structure were investigated as components of a simulation game known to be effective at achieving a specific educational objective. However, there has been at least one study (Fennessey, et al., 1972) in which the investigators used an existing role-play exercise that had not been experimentally tested for effectiveness and added to it the structure of an appropriate simulation game. Classes who played the game were compared with classes who played the original role-play exercise and with classes who received instruction in the same subject by other, more conventional methods. The results showed no significant differences between treatment groups, despite the large size of the sample (60 classes; 1, 874 students).

The experiment reported in this paper was basically a replication[1] of the experiment by Livingston and Kidder (1972), although it differed from the original experiment in two important ways. First, the subjects were 8th graders, rather than 10th and 11th graders. Second, this experiment was administered under typical classroom conditions; the earlier experiment was not. On the basis of the earlier experiment, both game structure and role identification were expected to make a significant positive contribution to the effectiveness of the Democracy game.

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[1] The replication was of the type that Lykken (1968) calls "constructive replication," rather than "literal replication" or "operational replication."

METHOD

The experimental treatments

The experiment employed four treatments. One of the experimental treatments ("game plus role") was the Democracy game itself. In the game, each player takes the role of a congressman. He receives a set of cards that indicate the number of votes toward his re-election that he will gain or lose according to Congress' action on each issue. The rules include a specified sequence of events, with provision for speeches, "bargaining" (i.e. log-rolling), and roll-call votes on the issues.

Two other experimental treatments were incomplete versions of the Democracy game. One of these ("game only") was an abstract simulation game in which all references to politics and legislation were removed, while the game structure was left intact. The rules were adapted, phrase by phrase, from those of the Democracy game by removing all political terms. The issues were replaced by "group choices," identified only by letters of the alphabet; a roll call vote became a "group decision," and so on. The other incomplete version ("role only") was an unstructured role-play exercise based on the issues in the Democracy game. Each player received a profile card identifying him as a congressman from a particular type of district and describing his constituents' interests. There was no step-by-step procedure. Instead, the rules specified only that "Issues may be voted on immediately, after debate, or after a recess."

The control treatment ("no game, no role") was a simulation game that was assumed to be irrelevant to the students' political attitudes, since

it had nothing to do with politics or group decisions.[1]

These four treatments form a 2 x 2 factorial experiment, in which the factors are the presence or absence of the game structure of the Democracy game and the presence or absence of the identification of the player's role as that of a congressman.[2]

[1]This game was Trade and Develop (Livingston, 1969), which simulated economic growth in an international economy.

[2]The experiment by Livingston and Kidder (1972) also included a fifth treatment -- a structured role-play exercise that included the step-by-step procedure of the Democracy game but not the scoring system. This version used the same profile cards as the unstructured role-play.

The dependent variables

The main dependent variable in this experiment was the students' acceptance of the practice of log-rolling by Congressmen, measured by the following three-item scale:

> Suppose two groups of Congressmen make an agreement: "You vote for our bill and we'll vote for your bill."
>
> | | Yes | No |
> |---|---|---|
> | Do you think this is unfair? | ( ) | ( ) |
> | Do you think this is undemocratic? | ( ) | ( ) |
> | Do you think this is dishonest? | ( ) | ( ) |

A second dependent variable was the students' belief in the prevalence of log-rolling in Congress. This variable was measured by a single item, placed directly after the three items on acceptance of log-rolling. The item simply asked, "How often do you think agreements like this are made in Congress?" The students' options were "Very often," "Fairly often," "Sometimes," "Occasionally," and "Almost never."

A third dependent variable was the students' political efficacy -- the belief that they can understand and influence the political process. Political efficacy was measured by a four-statement scale:

> Ordinary people can influence the Government if they work at it.
>
> Sometimes politics and government seem so complicated that a person like me can't really understand what's going on.
>
> The average person can't do much about politics and government.
>
> I think I understand politics fairly well.

The response options for each statement were "I definitely agree," "I tend to agree," "I tend to disagree," and "I definitely disagree."

A fourth dependent variable was the students' intention to participate in the political process, measured by a four-item scale:

> Do you intend to register to vote as soon as you are 18?
>
> Would you write a letter to your Congressman telling him how you felt about a political issue?
>
> Would you work as a volunteer in an election campaign (handing out leaflets, and so on) for a candidate you favored?
>
> Would you contribute money to the campaign fund of a candidate you favored?

The response options for these questions were "Yes, definitely," "Probably," "I might," "Probably not," and "Definitely not."

A fifth dependent variable was the students' knowledge of the names of their representative and Senators in the United States Congress. This measure indicated the extent to which the experimental treatments motivated the students to acquire this information during the two full days between their first exposure to the games and the administration of the questionnaire. The effect of the students' previous knowledge was controlled by the random assignment of subjects to treatments.

Subjects and procedure

The subjects were 141 students in four eighth grade classes at a junior high school in a northern Chicago suburb. They were assigned randomly within classes to the four treatments, producing a 2 x 2 x 4 randomized-block design. The students played the three games and the role-play exercise in their regular social studies classes for two days, forty minutes each day. On the third day they answered the questionnaires.

All the activities were administered by the regular social studies teacher. Thus, during each of the four classes, one teacher was supervising four different group activities at the same time. The experimenter was not present at any time during the experiment.

RESULTS

Table 1 shows the results for the main dependent variable, the students' acceptance of log-rolling as part of the legislative process. Figure 1 shows the means and 95% confidence intervals for the four treatment groups. (The scores on this variable and on the other three attitude variables have been linearly transformed so that +1.00 represents the maximum possible score, -1.00 represents the minimum possible score, and 0.00 represents a neutral position.) The differences between treatment group means are large and in the expected direction; the game-plus-role group is highest and the no-game, no-role group is lowest. Analysis of variance shows both the game and role factors significant beyond the .001 level, accounting for 10 per cent and 11 per cent of the total variance, respectively.

Table 2 presents the results for the students' belief in the prevalence of log-rolling in Congress. Figure 2 shows the means and 95% confidence intervals for the four treatment groups. The results for this variable are similar to those for acceptance of log-rolling, but the effects are not as strong; the treatment factors account for only about 4 per cent and 5 per cent of the total variance.

Table 3 shows the results for political efficacy. The differences between treatment groups are small and the effects do not approach statistical significance.

Table 4 shows the results for the students' intention to participate in the political process. Again, the treatment effects are not significant. However, there is a significant treatment x class interaction accounting for about 7 per cent of the total variance.

Table 5 shows the results for the students' knowledge of the names of their U.S. Senators and representative. These scores are expressed as a simple percentage; that is, a student who knew all three names received a score of 1.00, and so on. The results for this variable are somewhat surprising. The treatment group differences are exactly the opposite of those predicted, and there is a significant role x class interaction that accounts for 13 per cent of the total variance. Figure 3 shows this interaction graphically.

Table 6 shows the intercorrelations of the five dependent variables. The figures above the main diagonal are the correlations computed over the entire sample, without respect to treatment group or class membership; those below the main diagonal are the within-cell correlations, pooled over all 16 cells in the design. The numbers on the main diagonal are the internal-consistency estimates (coefficient alpha).[1] None of these correlations is large enough to indicate a substantial proportion of common variance between two variables, although the correlations are undoubtedly attenuated by the low internal consistency of the questionnaire scales.

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[1] Coefficient alpha is a version of formula KR-20 that does not require the items to be dichotomous.

DISCUSSION

The co-ordinator's manual for the Democracy game states (p.4):

> In playing the game, the Legislator finds that if he is to succeed -- that is, if he is to satisfy a majority of his constituents and thus be re-elected -- he must carry out negotiations, exchanges, and make agreements with other Legislators. He must be willing to make any agreement that will sacrifice the issues least important to his constituents if the agreement will strengthen his power over issues most important to his constituents. This activity is most necessary in a legislature, but it is often viewed with suspicion by citizens.
>
> One of the most important things learned from the game is that this kind of negotiation and exchange is necessary if the Legislator is to do the best job for his constituents.

The results of this experiment show clearly that the Democracy games does accomplish this objective and that both the role identification and game structure present in the game contribute substantially to its success. The results also show the effects of the Democracy game to be quite specific. While the game succeeded in teaching that log-rolling is an acceptable part of the legislative process, it did not succeed in building the students' political efficacy or in stimulating them to want to participate in the political process -- not even to the extent of finding out the names of their own congressmen.

As a replication, this experiment corroborates the findings of the earlier experiment by Livingston and Kidder (1972). Those findings have now been reproduced under classroom conditions. The question that remains is whether they will generalize to other simulation games with other educational objectives. If so, they will have important implications for developers and users of social studies curriculum materials. They imply that the players' roles in a simulation game should be clearly identified

if the game is to attain its maximum effectiveness at teaching the players about the behavior of people in the real-world situation that the game represents. They also imply that, insofar as this behavior is rational, a true simulation game is likely to produce better understanding of it than a role-playing exercise. This distinction is an important one, though it is sometimes ignored by publishers of social studies materials. A true simulation game contains rules and (usually) a scoring system that correspond to the constraints and incentives that guide behavior in the real-world situation. The player in the game chooses a certain behavior, not because he thinks it is what his real-world counterpart would do, but because he sees that is is advantageous for him in the game-- and thus also for his counterpart in real life. The reason the player's role should be clearly identified is to enable him to see the correspondence between the game and the real-world situation; between his own behavior and that of his real-world counterpart.

One feature of the data in this experiment fails to support this interpretation -- the absence of a significant positive game x role interaction. If both role identification and game structure are necessary for the effectiveness of the game, the students in the role-only and game-only treatments should have scored considerably lower than they did -- closer to the control group than to the role-plus-game group. Nevertheless, the above interpretation may still be correct, because the conditions of the experiment may have raised the scores of these two groups in three ways.

First, experimental "contamination" could have raised the scores of both the role-only and game-only treatment groups. Because all four

treatments were administered in the same classroom at the same time, the students in the role-only group may have observed and copied the log-rolling behavior of the game-only and the role-plus-game groups. Similarly, the students in the game-only group may have overheard and adopted the political terms used by the role-only and the role-plus-game groups. The students in the control group would be less likely to be affected, because the log-rolling behavior and the political vocabulary of the other groups were irrelevant to the game they were playing.[1]

Second, the role-only treatment may not have been "pure." That is, it may have contained one important element of the game structure of the Democracy game. The player's goals may have been implied by the profile cards, which contained such phrases as "Your constituents want ..." and "Your constituents are concerned about ..." These statements on the cards may have prompted the players to engage in some log-rolling, though probably much less than in the game-only and the role-plus-game groups, who were explicitly instructed to bargain for votes.

Third, the questionnaire used to measure the effect of the game may have been a reactive measure for the game-only group. That is, the political context of the questions and their closeness in time to the game may have led some of the students in the game-only group to draw the analogy between their behavior in the game and the behavior of legislators in real life. In this way the questionnaire may have had the same effect as a follow-up discussion. However, the difference between the scores

[1] Some evidence for this explanation is provided by the earlier study by Livingston and Kidder (1972), which was administered under conditions that would make this kind of "contamination" less likely to occur. The results of that experiment showed a small positive interaction that fell just short of statistical significance. It accounted for 1.7 percent of the total variance, as compared with 5.3 and 8.4 per cent for the game and role effects, respectively.

of the game-only group and the role-plus-game groups suggests that many of the students in the game-only group did not draw the analogy between their "Group Decision" game and the United States Congress.

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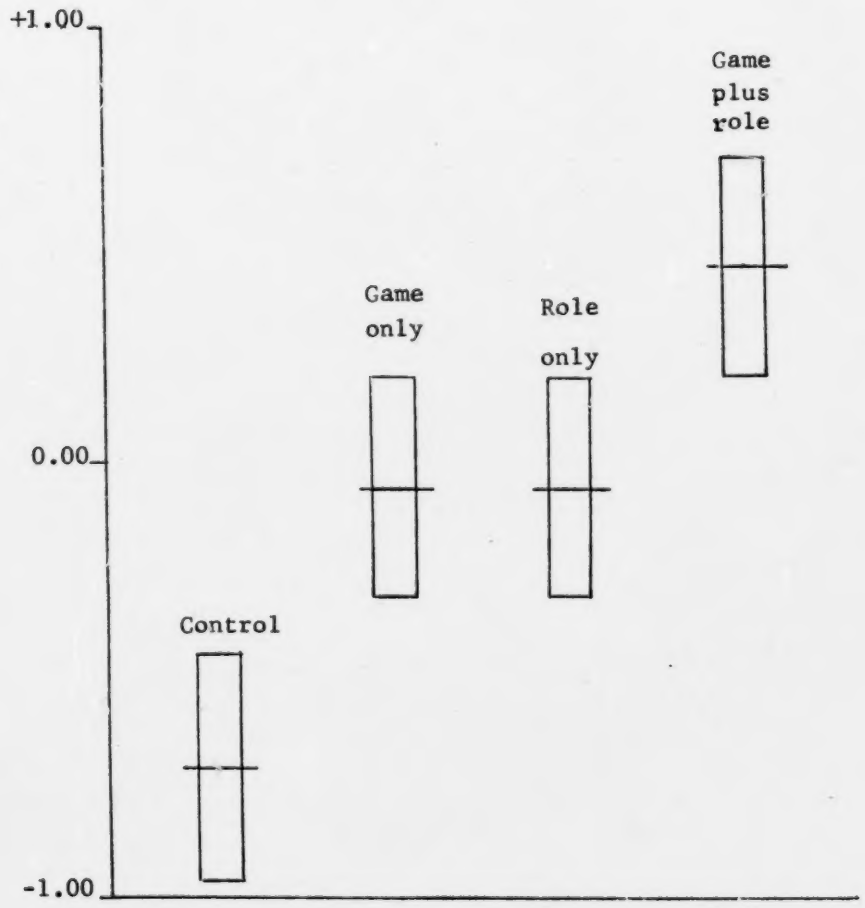

Figure 1. Acceptance of log-rolling: means and 95% confidence intervals.

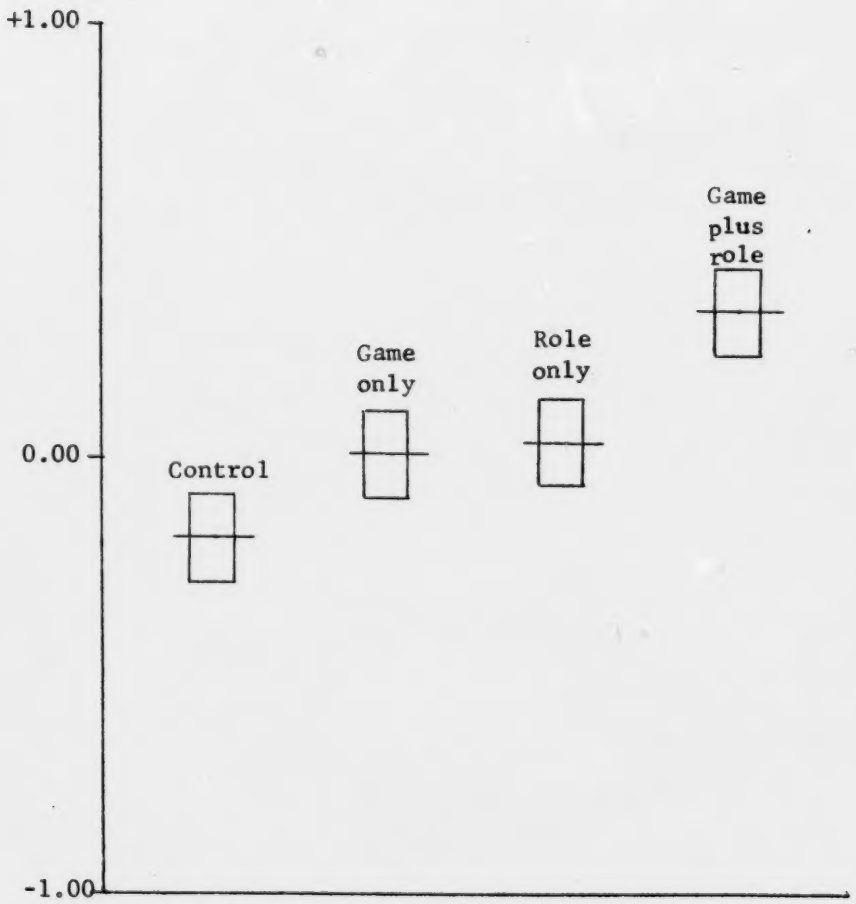

Figure 2. Belief in prevalence of log-rolling. Means and 95% confidence intervals.

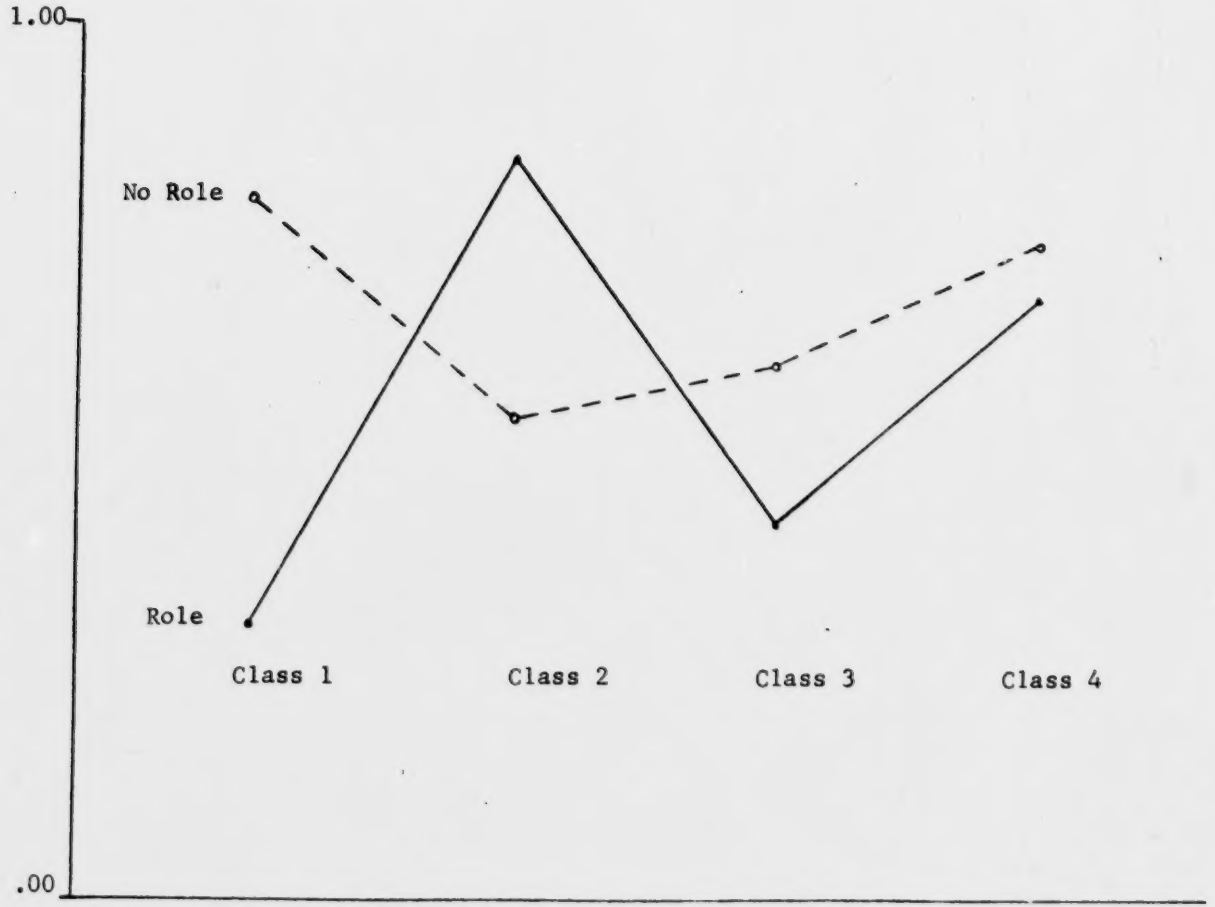

Figure 3. Knowledge of names of own congressmen: role x class interaction.

Table 1

Acceptance of "Log-rolling"

	Means (combined across classes)		
	No Game	Game	Combined
No Role	-.70	-.06	-.36
Role	-.06	+.45	+.19
Combined	-.36	+.19	+.08

Standard deviation, within cells (pooled variance) = .74

Internal consistency (alpha) = .84

	Analysis of variance					
Source	df	SS	MS	F	P	η^2
Game	1	10.56	10.56	19.36	.001	.100
Role	1	11.62	11.62	21.31	.001	.110
Classes	3	4.13	1.38	2.53	.06	.039
GxR	1	0.28	0.28	0.51	N.S.	
GxC	3	3.64	1.21	2.23	N.S.	
RxC	3	1.65	0.55	1.01	N.S.	
GxRxC	3	5.29	1.76	3.23	N.S.	
Within Cells	125	68.19	0.546		.025	.050
Total	140	105.37				

Table 2

Belief in Prevalence of "Log-rolling"

Means (combined across classes)

	No Game	Game	Combined
No Role	-.18	+.01	-.08
Role	+.04	+.34	+.19
Combined	-.07	+.17	+.06

Standard deviation, within cells (pooled variance) = .30

(No internal consistency estimate is possible, since this variable was measured by a single questionnaire item.)

Analysis of variance

Source	df	SS	MS	F	P	η^2
Game	1	2.01	2.01	5.53	.025	.038
Role	1	2.71	2.71	7.45	.01	.051
Classes	3	0.55	0.18	0.50	N.S.	
GxR	1	0.09	0.09	0.24	N.S.	
GxC	3	0.30	0.10	0.28	N.S.	
RxC	3	1.20	0.40	1.10	N.S.	
GxRxC	3	0.70	0.23	0.64	N.S.	
Within cells	125	45.49	0.091			
Total	140	53.05				

Table 3

Political Efficacy

Means (combined across classes)

	No Game	Game	Combined
No Role	-.07	+.07	+.01
Role	.00	.00	.00
Combined	-.03	+.04	.00

Standard deviation, within cells (pooled) = .30

Internal consistency (alpha) = .35

Analysis of variance

Source	df	SS	MS	F	P
Game	1	0.17	0.17	1.92	N.S.
Role	1	0.001	0.001	0.01	N.S.
Classes	3	0.56	0.19	2.09	N.S.
GxR	1	0.16	0.16	1.81	N.S.
GxC	3	0.19	0.06	0.70	N.S.
RxC	3	0.35	0.12	1.32	N.S.
GxRxC	3	0.11	0.04	0.41	N.S.
Within Cells	125	11.11	0.089		
Total	140	12.64			

Table 4

Intention to Participate in the Political Process

Means (combined across classes)

	No Game	Game	Combined
No Role	+.17	+.13	+.15
Role	+.17	+.18	+.18
Combined	+.17	+.15	+.16

Standard deviation, within cells (pooled) = .31

Internal consistency (alpha) = .43

Analysis of variance

Source	df	SS	MS	F	P	η^2
Game	1	0.01	0.01	0.14	N.S.	
Role	1	0.03	0.03	0.27	N.S.	
Classes	3	0.35	0.12	1.20	N.S.	
GxR	1	0.03	0.03	0.28	N.S.	
GxC	3	0.18	0.06	0.64	N.S.	
RxC	3	0.94	0.31	3.29	.025	.067
GxRxC	3	0.60	0.02	2.09	N.S.	
Within Cells	125	11.97	0.096			
Total	140	14.12				

Table 5

Knowledge of Names of Own Congressmen

Means (combined across classes)

	No Game	Game	Combined
No Role	.76	.60	.68
Role	.62	.51	.57
Combined	.69	.56	.62

Standard deviation, within cells (pooled) = .32

Internal consistency (alpha) = .68

Analysis of variance

Source	df	SS	MS	F	P	η^2
Game	1	0.56	0.56	5.48	.025	.030
Role	1	0.45	0.45	4.40	.05	.024
Classes	3	1.03	0.34	3.36	.025	.055
GxR	1	0.04	0.04	0.35	N.S.	
GxC	3	0.43	0.14	1.41	N.S.	
RxC	3	2.41	0.80	7.90	.001	.130
GxRxC	3	0.88	0.29	3.20	.05	.047
Within cells	125	12.71	0.102			
Total	140	18.49				

Table 6

Intercorrelations and Internal Consistency Estimates for Dependent Variables

	Acceptance of log-rolling	Belief in prevalence of log-rolling	Political efficacy	Intention to participate	Knowledge of names of own congressmen
Acceptance of log-rolling	(.84)	.25	.20	.04	-.24
Belief in prevalence of log-rolling	.15	--	.15	.04	-.05
Political efficacy	.22	.13	(.35)	.19	.07
Intention to participate	.04	.00	.18	(.43)	.06
Knowledge of names of own congressmen	-.02	.06	.09	.15	(.68)

Note: Numbers below the main diagonal are pooled, within-cell correlations. Numbers on the main diagonal are internal-consistency estimates. No internal-consistency estimate is possible for "Belief in prevalence of log-rolling," since it was measured by only a single questionnaire item.